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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,401	07/18/2003	Mehran Arbab	1773A1	4641

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EXAMINER	
PARKER, FREDERICK JOHN	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,401	ARBAB ET AL.	
	Examiner	Art Unit	
	Frederick J. Parker	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *18-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 10/6/03; 9/7/04
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-17 in the reply filed on 7-20-06 is acknowledged. The traversal is on the ground(s) that there would be no serious burden of search on the Examiner to search all inventions because searches would allegedly be "co-extensive". This is not found persuasive because the presence of multiple inventions would necessarily, in and of itself, cause an undue burden on the Examiner because of the excessive time required to perform searches of different inventions. However, the burden on the Examiner extends to PATENTABILITY ISSUES associated with, and evolving from, searching for multiple different inventions. Issues related to one statutory class are generally very different from those of other statutory classes. That is, issues arising from method claims would potentially be very different from those of article or apparatus claims, and may require complex evidence to resolve critical issues which would be dissimilar and unfamiliar to an Examiner in an unrelated art area. Hence, the examination of multiple inventions, in this case directed to method and product, represents a serious and undue burden on the Examiner because of excessive and non-overlapping searches, and the evolution of complex and unfamiliar patentability issues related to examining multiple and distinct inventions. Restriction is therefore proper under the guidelines of MPEP 803.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1,7,10,11,12,14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 1 is vague and indefinite because in b) the phrase "having a certain temperature" is meaningless because every object has a certain temperature at any given time and conditions; for interpretation, the substrate article may be of any temperature; step c) is vague and indefinite because (1) the phrase "high energy zone" is a relative phrase which is exemplified but not explicitly defined by the specification, and its meaning would not have been apparent to one skilled in the art; for interpretation, any portion of the reaction zone utilizing energy higher than portions without that energy will be considered to meet the limitation, and (2) the step is confusing because the limitation "comes in contact with the surface of the article" is never actually previously required by the method, only that the starting fluid be forced "toward the article" without the requirement of actual contact.
- Claims 7, 10 are vague and indefinite because they utilize impermissible Markush language which fails to define the intended scope of the Markush Group, see MPEP 2173.05h.
- Claims 10,11 are vague and indefinite because the phrase "high energy zone" is a relative phrase which is exemplified but not explicitly defined by the specification, and its meaning would not be apparent to one skilled in the art; for interpretation, any portion of the reaction zone utilizing energy higher than portions without that energy will be considered to meet the limitation.

- Claim 12 is vague and indefinite because it requires the **size** of the structures to be **spherical**, sphericity in no way denotes size as apparent to one of ordinary skill.
- Claim 14: "nano-scaled structure" (singular) lacks antecedent basis.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5,7-8,10,14,15 are rejected under 35 U.S.C. 102(b) as being anticipated by Wang US 5540959.

Wang teaches a method of coating an article/ substrate (metal, ceramic, glass, plastic, single crystals, etc) comprising forming droplets (about 0.1-100 microns) of a mist/ aerosol from a liquid precursor solution (metal salt, metal oxide, suspension, solution, etc col. 2, 57-col. 3, 11; etc) in a carrier gas stream; exposing the stream to a plasma and also subjecting it to radio frequency radiation ("high energy zone") to cause vaporization of the stream which is propelled to the substrate, where it is deposited thereon. Coated substrates are then heat treated. The substrate need not be heated but may be heated at 200-1200 C/ 390-2190F (col. 20, 32-40; col. 7, 66-67; etc) and therefore the substrate/ article has a "certain temperature. Since the process produces the same aerosol mists as Applicants claims and applies them on the same substrates, the process would have inherently apply nano-scaled structures (as defined by Applicants on page 3) with the same particle-substrate interactions as required by claim 1's "whereby" step,

especially given col. 7, 14-23. of Wang. Per claim 14, col. 21, 10-15 further teaches to dip the coated substrate into the coating solution to provide denser, more adherent coatings (step 222).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 6,9,11-13,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang.

Wang is cited for the same reasons previously discussed, which are incorporated herein. Wang cites substrate temperatures of the substrate need not be heated but may be heated at ambient-1200 C/ to 2190F (col. 20, 32-40; col. 7, 66-67; etc) which overlaps the temperatures of claims 6 & 9; the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the temperatures disclosed by the reference were selected because overlapping ranges have been held to be a prima facie case of obviousness, see In re Wortheim 191 USPQ 90. Heating means is not limited, and would have included ovens and other "hot wall reactors", per claim 11. Per claim 12, particle shapes are not limited and therefore would have included spherical particles. Since the examples cite forming films, the applied nano-particles would have contacted one another if deposition continued long enough to form continuous coatings, per claim 13. While dissolution is not explicitly cited, given the porosity of the substrates and the unlimited precursor solutions, there would have been expected at least some minute degree of dissolution, per claim 16.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the process of Wang utilizing the overlapping substrate temperatures and particle deposition variations because such variations are within the purview of one of ordinary skill, with the expectation of successfully forming coatings for a desired end-use application.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Grant US 2003/0116091 (EFD 12-4-01).

Wang is cited for the same reasons previously discussed, which are incorporated herein. While Wang specifically teaches metal precursors in a solvent as the starting liquid, organo-metallic solutions are not cited. However, Grant teaches a similar vapor deposition coating process comprising forming an atomized mist from a liquid precursor followed by deposition and decomposition to form a film. [0024] expressly teaches the use of liquid precursor solutions including metal-organic precursors (synonymous with "organometallic") which are known to produce such films upon decomposition.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Wang incorporating the organo-metallic precursor solutions of Grant as the starting liquid because they are taught by Grant to produce similar, useful coating films under similar atomization/ misting conditions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick J. Parker whose telephone number is 571/ 272-1426. The examiner can normally be reached on Mon-Thur. 6:15am -3:45pm, and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571/272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Frederick J. Parker
Primary Examiner
Art Unit 1762

fjp